FEBRUARY 1979
No. 2

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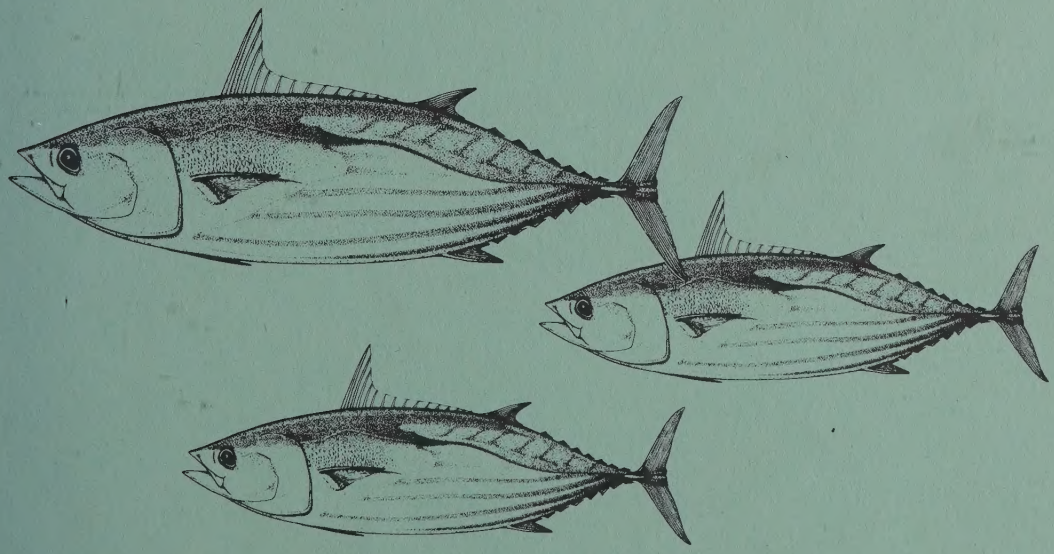
Southwest Fisheries Center-La Jolla, California



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FISHING INFORMATION

FEBRUARY 1979, No. 2

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PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

To cancel delivery of this publication in the event you no longer need to receive it, or to change the delivery address if you are moving but still need to receive it, please notify us by writing: James A. Renner, Editor, Fishing Information, National Marine Fisheries Service, Southwest Fisheries Center, P. O. Box 271, La Jolla, California 92038.

Submitted for publication - March 30, 1979

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ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15 day supplement)

TECHNICAL EDITOR:
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    National Ocean Survey, Pacific Marine Center, Seattle, Washington

Fisheries Research Board of Canada, Pacific Environment Institute, West Vancouver, British Columbia by L. F. Giovando from observations by:
    J. Redhead at Langara Island Light; D. Veale at Cape St. James Light;
    L. Collins at Kains Island Light; M. V. Stewart at
    Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

During February the eastern subtropical high pressure center is normally near 30°N, 130°W (Figure 1), and the Aleutian low pressure center near 55°N, 175°W. Weather systems usually develop and intensify in the central Pacific between 35°N and 45°N and fronts move rapidly eastward, frequently crossing the U.S. west coast. Bands of high winds, heavy rains and extensive cloud cover associated with the fronts cause increased ocean mixing and decreased solar heating which tends to cool the ocean surface layers along the paths of the storms. South of 35°N the high pressure system is normally associated with light winds and clear skies. Solar heating of the ocean surface is greatest in the center of the high and along the high pressure ridge line.

In February 1979 the subtropical high pressure center was located near 30°N, 137°W and the major Aleutian low center moved east of its normal position into the Gulf of Alaska near 55°N, 145°W (Figure 2). A weak low pressure trough persisted along the U.S. west coast and a strong trough was located along the coast of British Columbia. Weather fronts moved southward along the west coast to Baja California.

The north Pacific ocean front was strongest between 40°N and 45°N west of 165°W where sea surface temperature (SST) isotherms were close together (Figure 3), and negative SST departures were illustrated adjacent to positive SST departures (Figure 5). The negative SST departures shown north of 35°N and west of 160°W were associated with strong ocean mixing, especially during storm passages north of 40°N. The high pressure ridge, which frequently extended into the Gulf of Alaska in December and January was replaced by the Aleutian low in February. Primarily because of more storm activity and below normal pressure in the Gulf, the large area of positive SST departures greater than 1°C was reduced to 3 smaller areas between 130°W and 150°W (Figure 5).

Most of the differences between SST's in February 1979 and February 1978 were positive west of 135°W. However, the area of positive differences more than 1°C was reduced in February north of 40°N compared to the large area of positive differences between January 1979 and 1978. South of 40°N and west of 150°W the area of positive SST differences expanded in February 1979. The February 1979-78 positive difference was extensive in the eastern Pacific (Figure 7). Apparently the expansion of the subtropical high pressure system in the central Pacific and the movement of the Aleutian low into the Gulf of Alaska led to warmer SST's than last year over a large part of the eastern Pacific from 30°N to 50°N. Along the coast of North America, the coastal area covered by negative SST differences greater than 1°C expanded westward and along most of the west coast in February. Frequent storm penetration along the entire west coast to southern Baja California, followed by strong northerly winds, maintained extensive ocean mixing and upwelling along the coast. Negative differences more than 2°C between SST's in February 1979 and 1978 are shown along the U.S. west coast and Baja California (Figure 7).

Western North Pacific

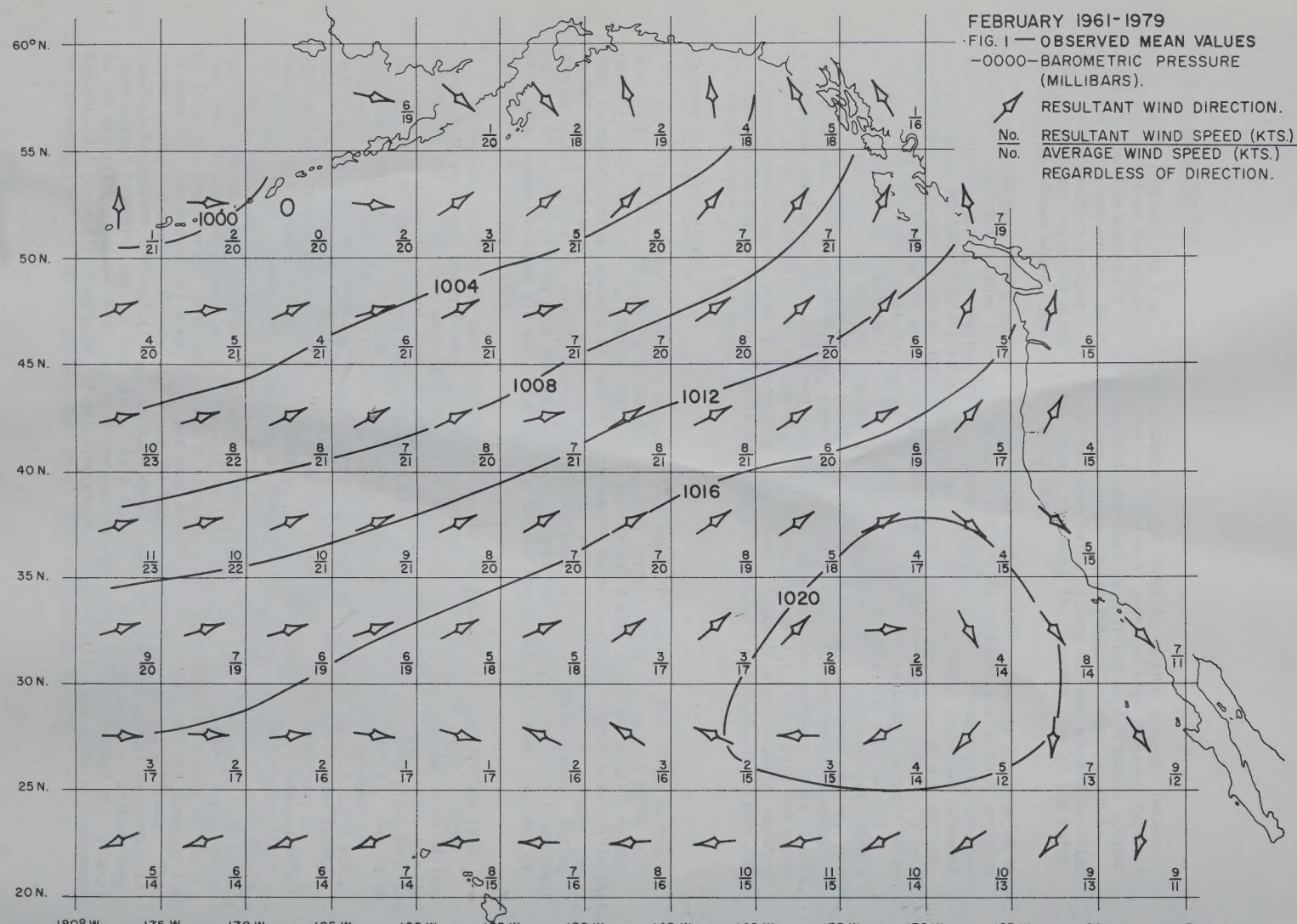
During February the Aleutian low pressure trough normally extends westward between 45°N and 55°N from the Aleutian low center. An east-west oriented high pressure system is normally found between 25°N and 35°N extending westward to join the high pressure system over the Asian continent. Storm centers and weather fronts frequently form along the western and southern periphery of the low pressure belt. Strong surface winds associated with storm areas intensify ocean mixing, especially along the northern edge of the north Pacific ocean front which normally lies along 40°N.

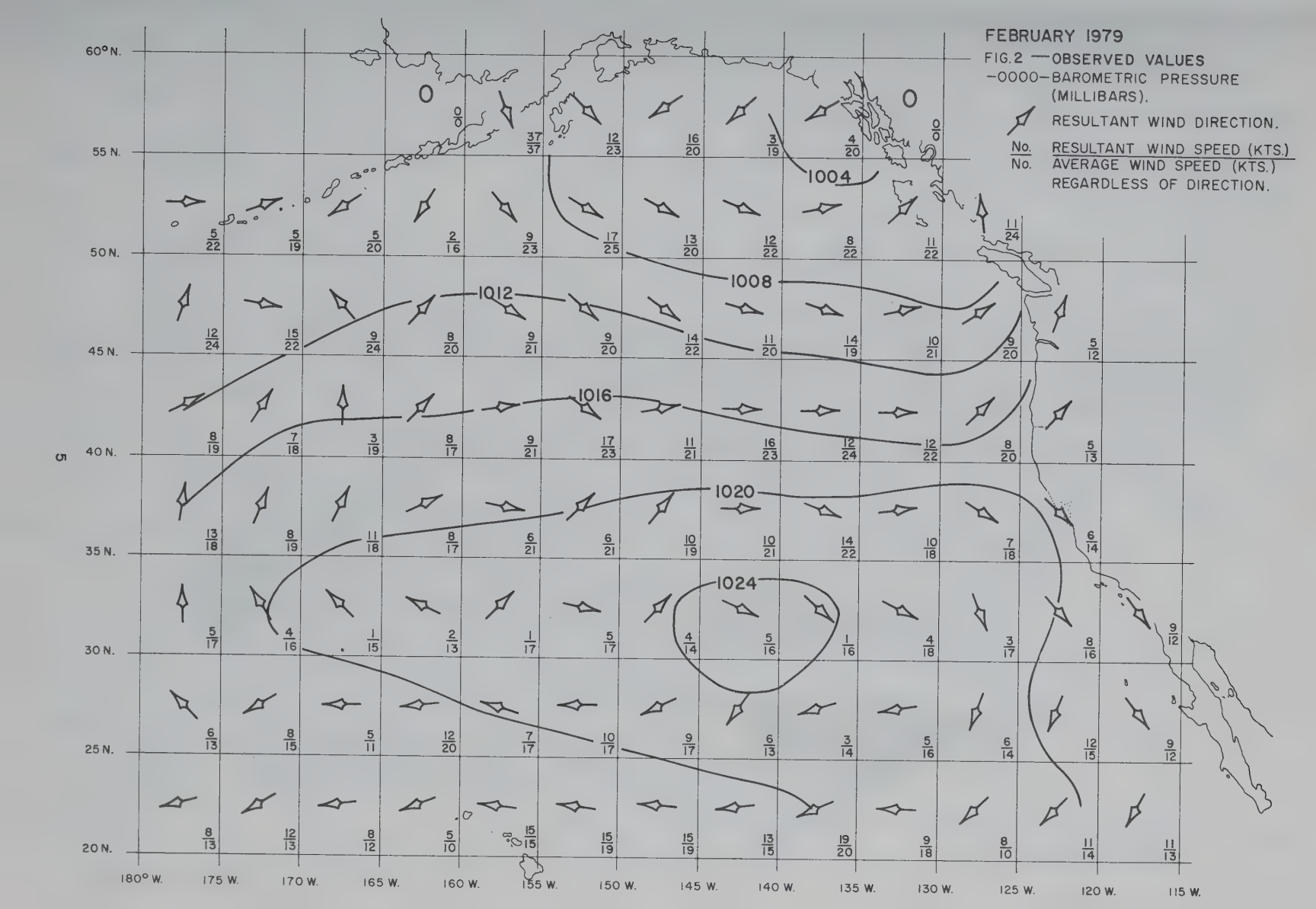
During February 1979 a secondary low pressure center, with an average location of 55°N, 170°E was a dominant feature across the north Pacific. The western Pacific high pressure system persisted across the western Pacific between 25°N and 30°N. Storm fronts developed east of Japan and moved rapidly eastward between 35°N and 45°N causing northward movement of warm water and air on the western edges of high pressure cells. Also, cold water was advected southward along the western edge of the Aleutian low pressure trough. As a result, the north Pacific ocean front was more intense (close packing of isotherms) between 35°N and 45°N than normal from Japan to 175°E (Figure 4). The wide bands of negative SST departures north of 42°N and positive SST departures south of 42°N (Figure 6) reflected a strong ocean frontal boundary at the surface. The large SST departures were caused, in part, by strong winds and ocean advection, especially in the Kuroshio Current which apparently transported warm water northward along Japan west of 155°E and then eastward south of 40°N. South of 35°N, the large region of positive SST departures were associated with the weaker circulation and clearer skies in the high pressure zone. Frequent storm activity north of Taiwan produced the north-south areas of positive and negative SST departures greater than 1°C shown between China and Japan.

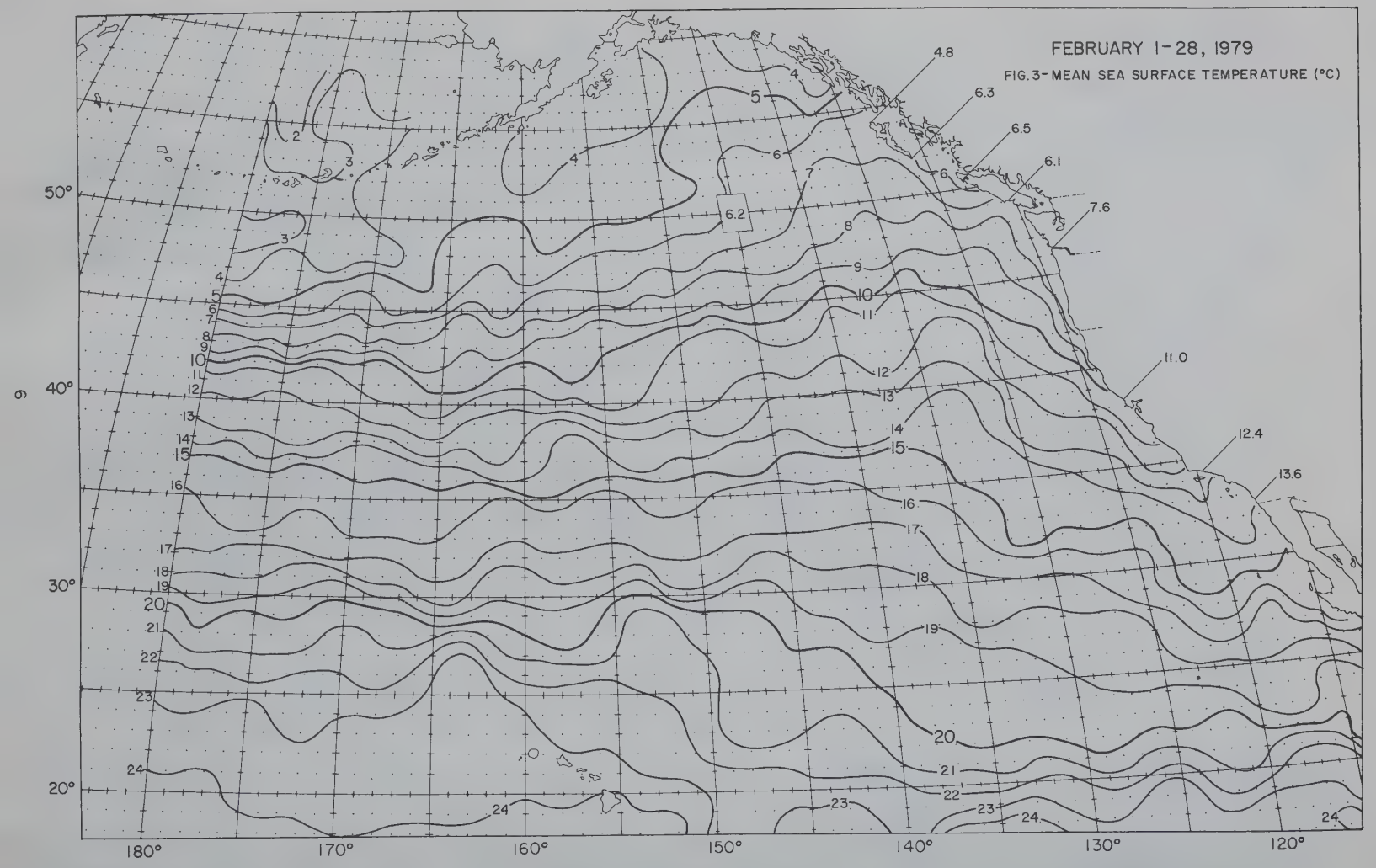
Eastern Tropical Pacific

During February, SST's normally decrease less than 1°C south of 30°N in the northern hemisphere. Between 5°N and 5°S in the Peru Current north of 20°S and east of 95°W, SST's normally increase 1 to 2°C. These equatorial and coastal areas, which are usually colder than surrounding areas because of upwelling, normally experience the largest seasonal increases in SST during February. The equatorial ocean front along the equator between Ecuador and the Galapagos Islands is usually weaker in February than during any other months. During periods of unusual warming near the equator, the largest positive SST departures from normal will often appear between 5°N and 5°S east of 90°W, and the equatorial ocean front may be absent in the surface layer.

In February 1979 in the northern hemisphere, the SST pattern was more diffuse than normal with no marked ocean frontal boundaries east of 150°W. Along the coast of Baja California the SST contours were bent southward along the coast of Baja and mainland Mexico (Figure 8) to a larger extent than in February 1978 or in January 1979. Apparently, stronger surface winds following storms helped to move colder water from north to south along Baja and produced a large area of negative SST departures as far south as 15°N (Figure 9). Two large areas with SST's more than 1°C below normal developed this month east and southwest of Hawaii (Figure 9). The increase in area covered by negative departures west of 130°W was associated with frequent development of upper air low pressure systems and weather frontal passages with strong easterly winds south of 30°N. Other small areas of negative SST departures were found along the coast of Mexico, Central America and near 8°N between 95°W and 102°W. In these areas, strong wind mixing frequently occurred following outbreaks of northerly winds from the Gulf of Mexico. Areas with SST's greater than 28°C (Figure 8) and positive departure greater than 1°C, occurred where surface winds and cloud cover were usually less than in adjacent colder areas. Tropical tuna fishing was active in those areas where positive and negative SST departures were in adjacent areas from 5°N to 15°N east of 110°W (Figure 9). The equatorial ocean front was weak between 85°W and 90°W; but was stronger than normal along the coast of Ecuador and along the equator west of the Galapagos Islands. The southern hemisphere subtropical high pressure center remained near its normal position with above normal pressures most of the month. As a result, the southeast trade winds from Peru to the central tropical Pacific were steadier and stronger than during December and January. Because of a general strengthening of the atmospheric circulation in the southern hemisphere in February, there are no indications that an El Niño will develop in 1979.

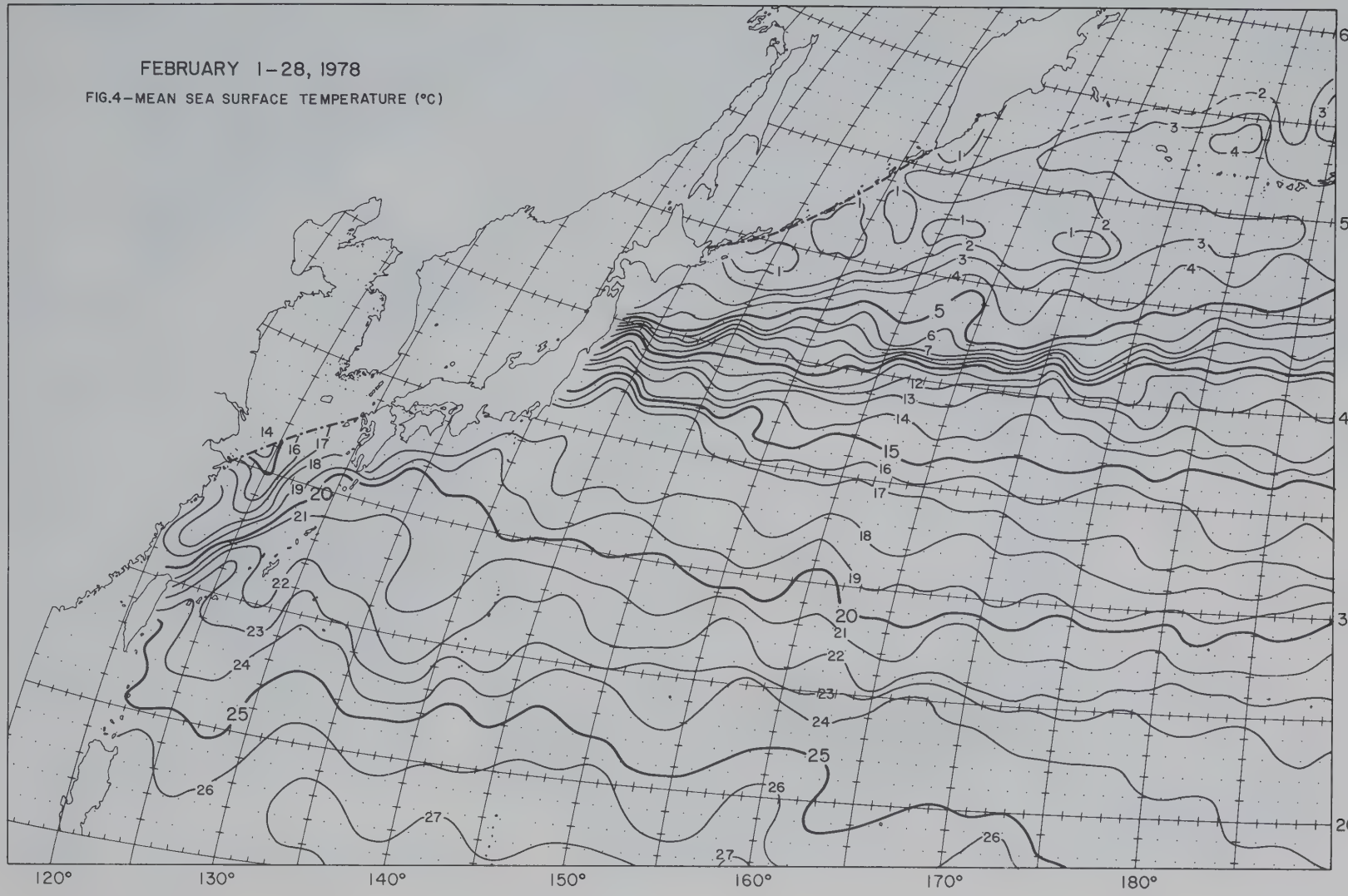

FEBRUARY 1961-1979
FIG. 1 — OBSERVED MEAN VALUES
-0000- BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1000
1004
1008
1012
1016
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

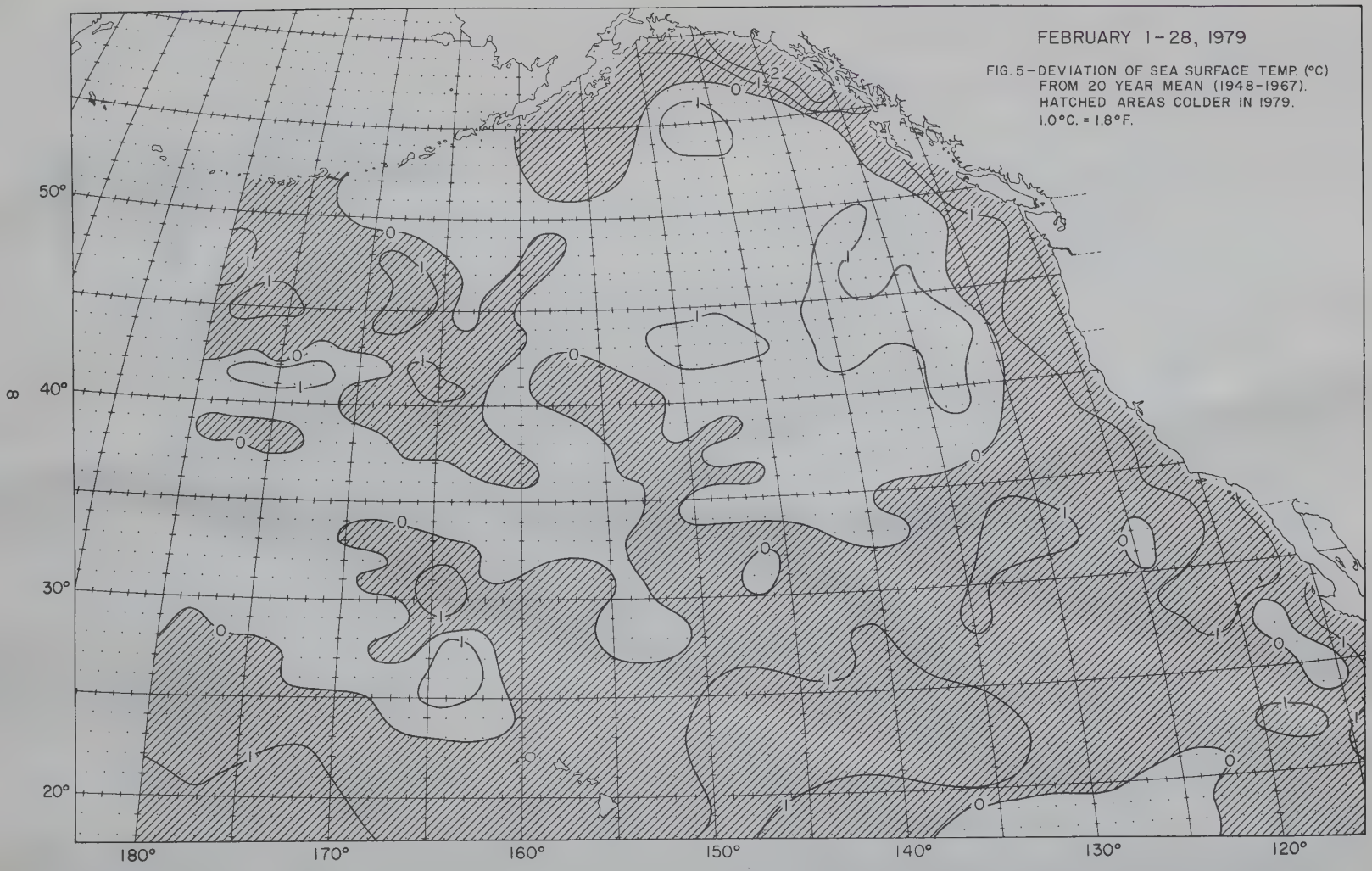

FEBRUARY 1979
FIG. 2 —OBSERVED VALUES
-0000- BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1004
1008
1012
1016
1020
1024
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

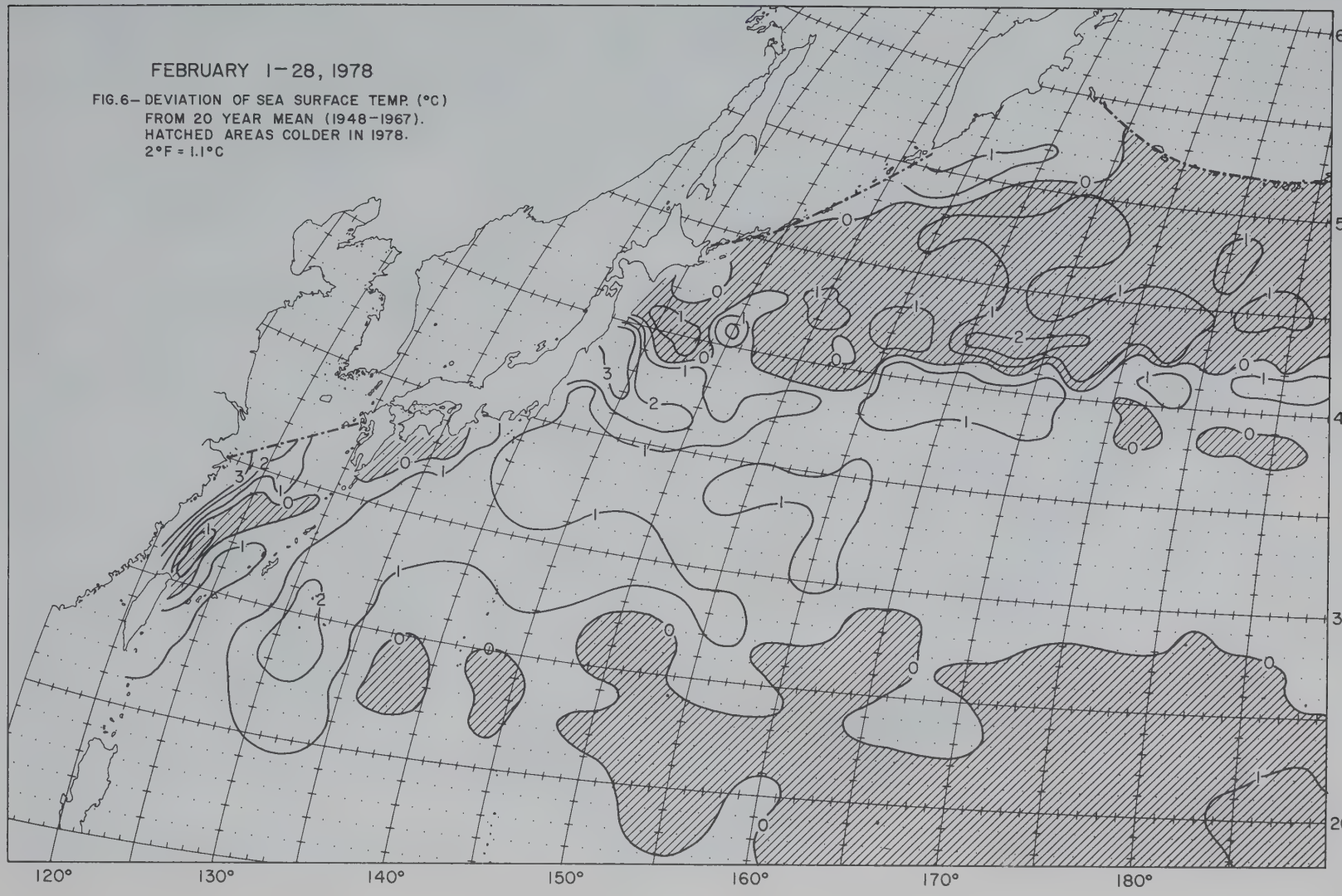

FEBRUARY 1-28, 1979
FIG. 3- MEAN SEA SURFACE TEMPERATURE (°C)
4.8
6.3
6.5
6.1
7.6
6.2
11.0
12.4
13.6
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

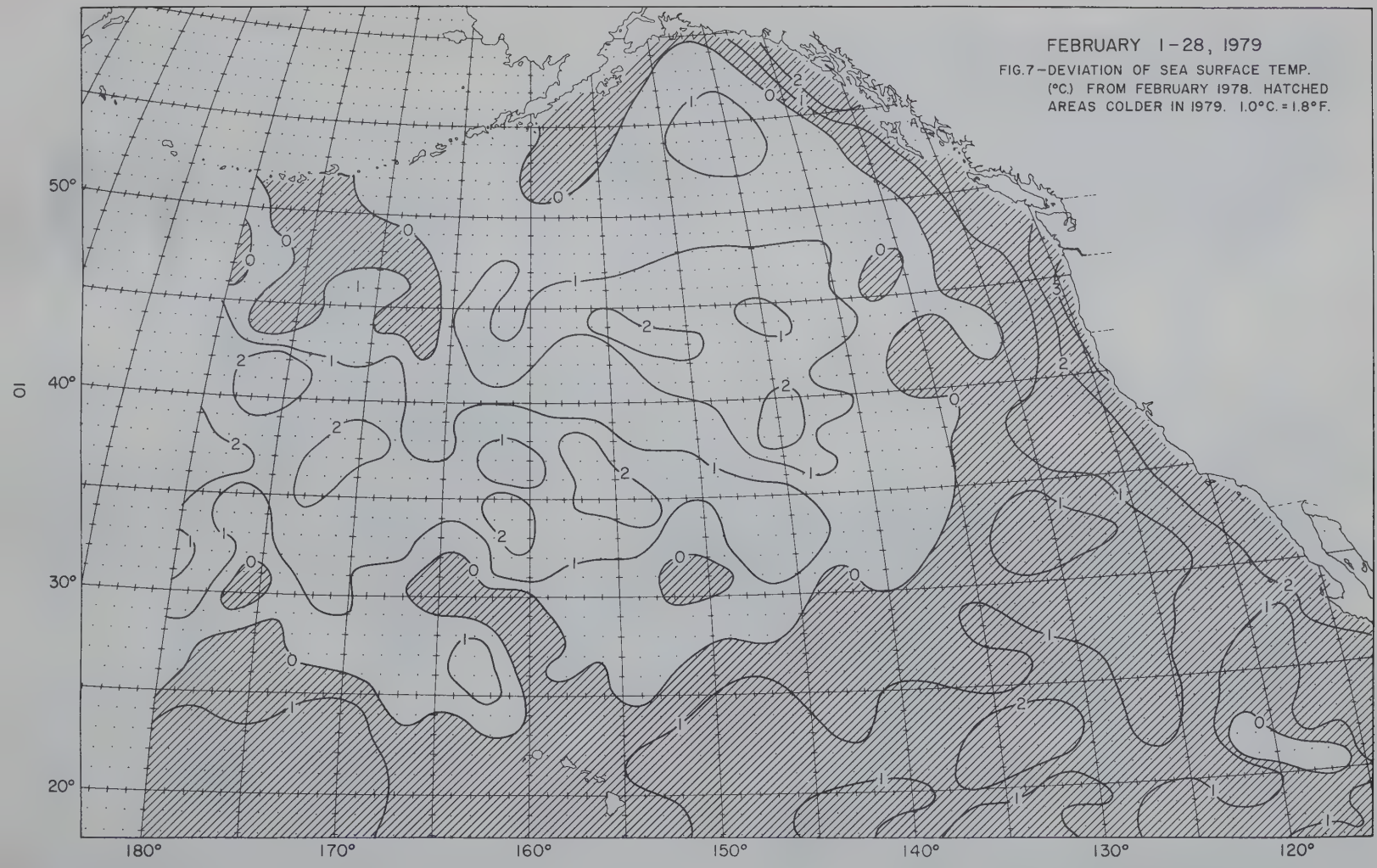
FEBRUARY 1-28, 1978

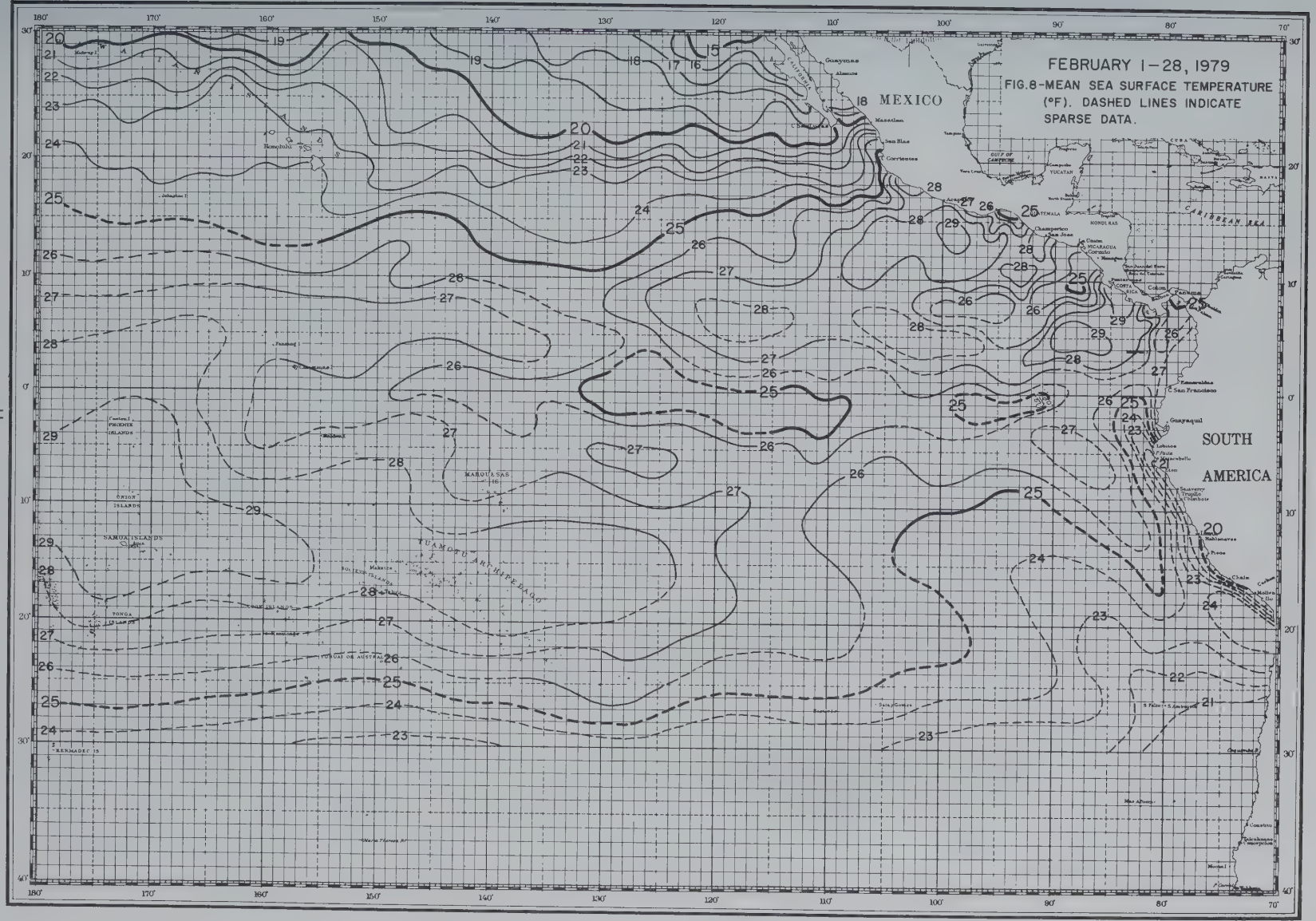
FIG.4-MEAN SEA SURFACE TEMPERATURE (°C)

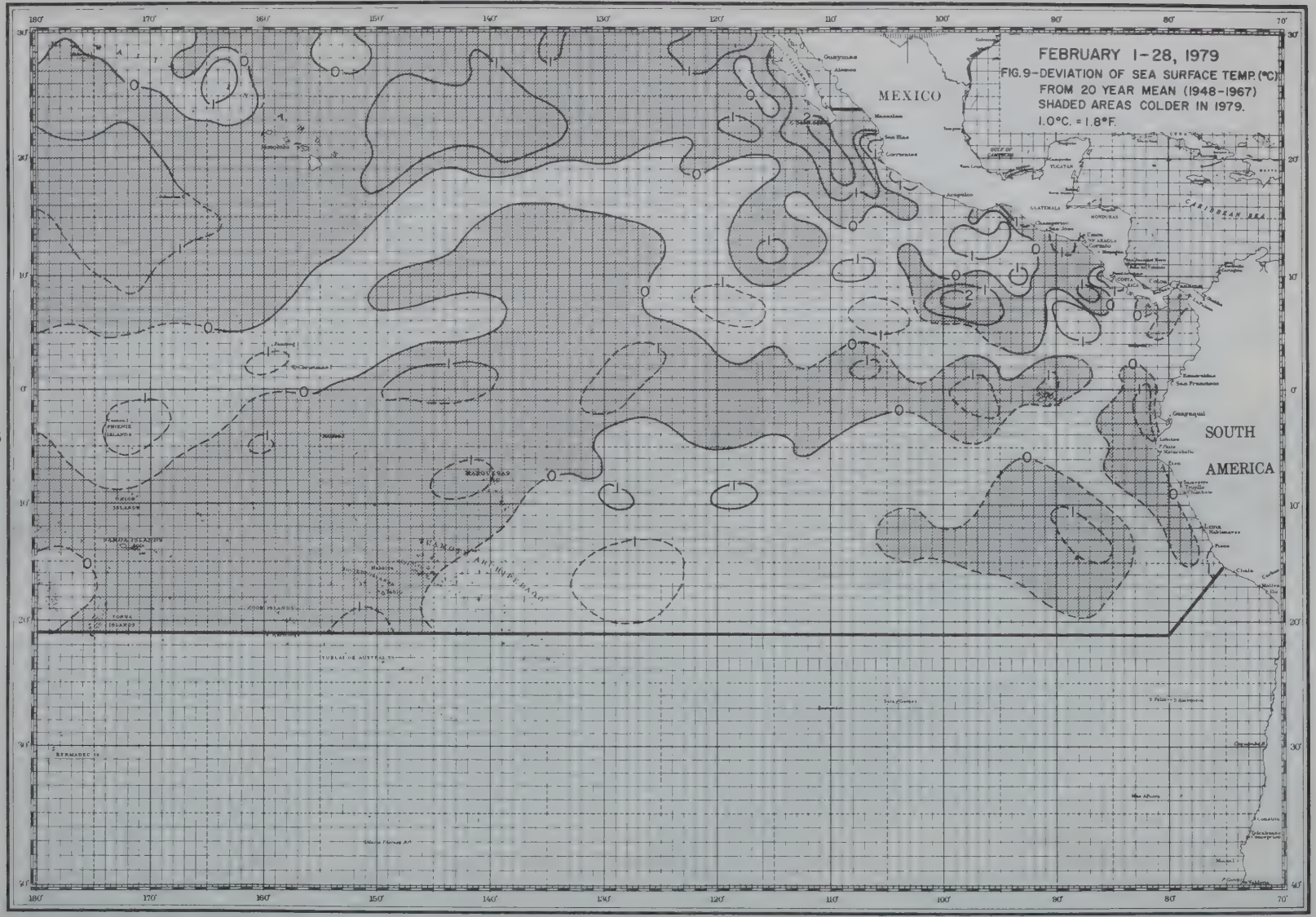



FEBRUARY 1-28, 1979
FIG. 5-DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948-1967). HATCHED AREAS COLDER IN 1979. 1.0°C. = 1.8°F.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

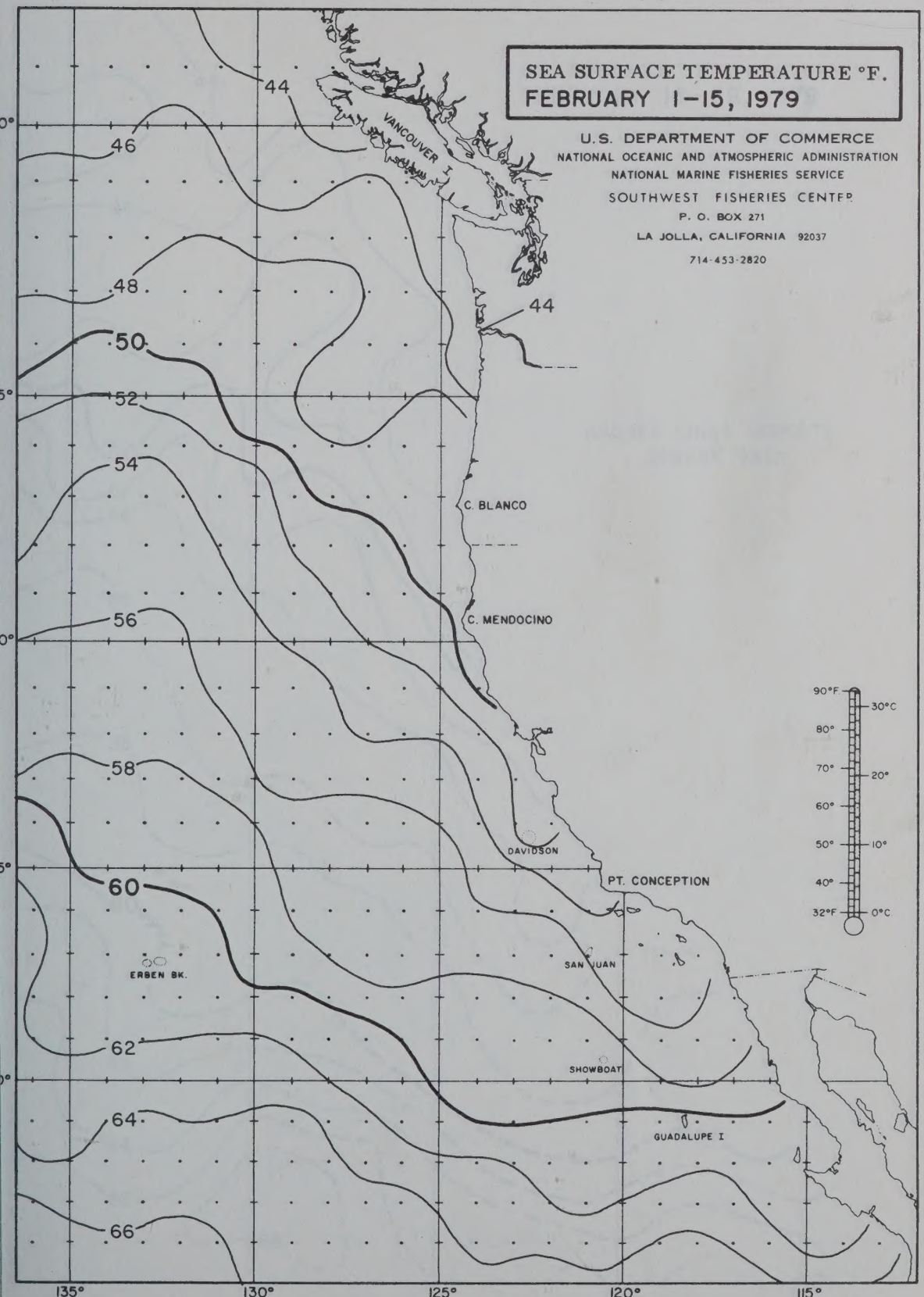

FEBRUARY 1-28, 1978
FIG.6- DEVIATION OF SEA SURFACE TEMP. (°C)
FROM 20 YEAR MEAN (1948-1967).
HATCHED AREAS COLDER IN 1978.
2°F = 1.1°C
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°

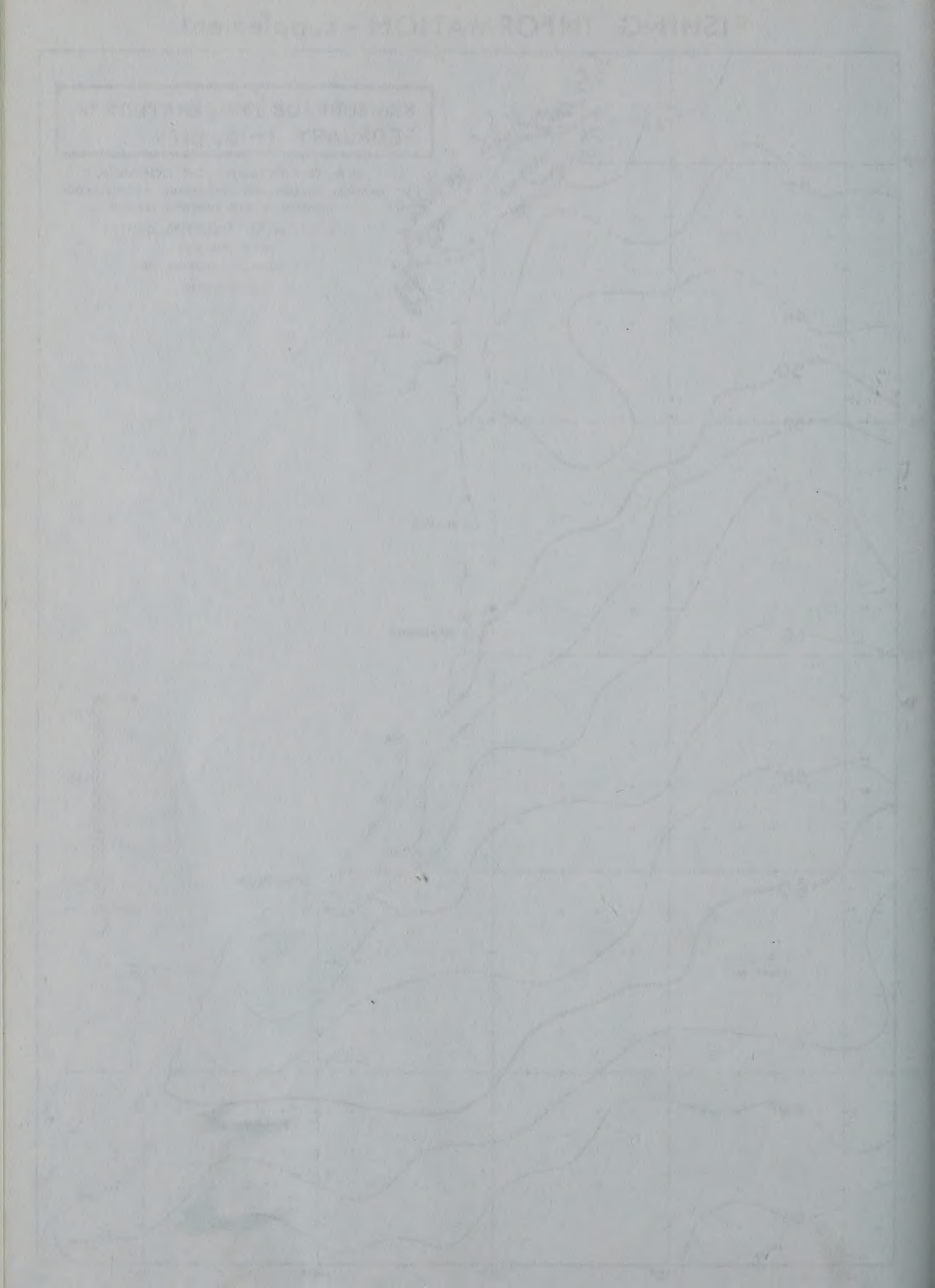

FEBRUARY 1-28, 1979
FIG.7-DEVIATION OF SEA SURFACE TEMP. (°C.) FROM FEBRUARY 1978. HATCHED AREAS COLDER IN 1979. 1.0°C. = 1.8°F.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


FEBRUARY 1–28, 1979
FIG.8-MEAN SEA SURFACE TEMPERATURE (°F). DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CAMPECHE
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
MARQUESAS
SAMOA ISLANDS
TONGA
TUAMOTU ARCHIPELAGO
PHOENIX ISLANDS
UNION ISLANDS
KERMADEC IS.
Guaymas
Mazatlan
San Blas
Corrientes
Acapulco
Guayaquil
Callao
Chile
Honolulu
Tahiti
Pitcairn I.
Easter I.
Juan Fernandez Is.
Galapagos Is.
Cocos I.
Malpelo I.
Clipperton I.


FEBRUARY 1-28, 1979
FIG. 9-DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948-1967) SHADED AREAS COLDER IN 1979.
1.0°C. = 1.8°F.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
COSTA RICA
PANAMA
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
30°N
20°N
10°N
0°
10°S
20°S
30°S
40°S

FISHING INFORMATION – supplement





FISHING INFORMATION – supplement